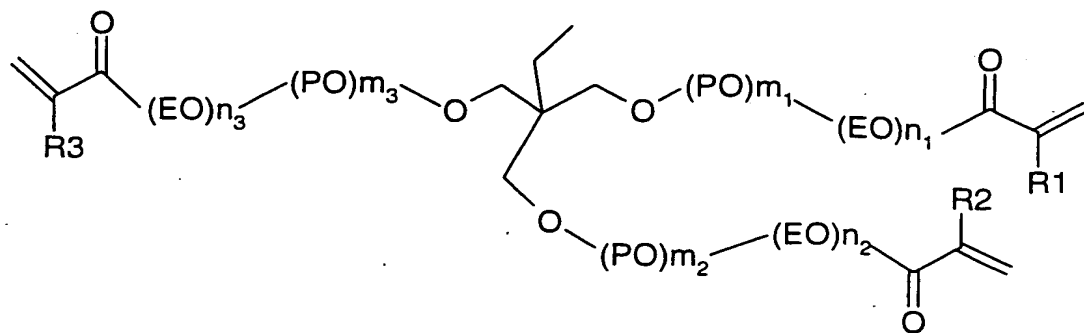


We claim:-

1. An ester F of the formula I



where EO is O-CH<sub>2</sub>-CH<sub>2</sub>-

PO is independently at each instance O-CH<sub>2</sub>-CH(CH<sub>3</sub>)- or  
O-CH(CH<sub>3</sub>)-CH<sub>2</sub>-

n<sub>1</sub>, n<sub>2</sub> and n<sub>3</sub> are independently 4, 5 or 6,

n<sub>1</sub> + n<sub>2</sub> + n<sub>3</sub> is 14, 15 or 16,

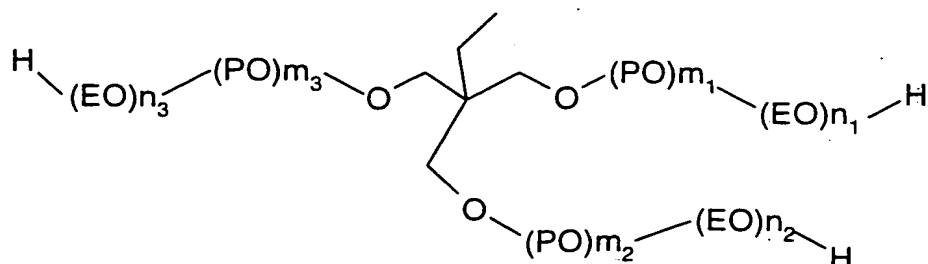
m<sub>1</sub>, m<sub>2</sub> and m<sub>3</sub> are independently 1, 2 or 3,

m<sub>1</sub> + m<sub>2</sub> + m<sub>3</sub> is 4, 5 or 6,

R<sub>1</sub>, R<sub>2</sub> and R<sub>3</sub> are independently H or CH<sub>3</sub>.

2. An ester F as per claim 1, wherein n<sub>1</sub> + n<sub>2</sub> + n<sub>3</sub> is 15.
3. An ester F as per either of claims 1 and 2, wherein n<sub>1</sub> = n<sub>2</sub> = n<sub>3</sub> = 5.
4. An ester F as per any of claims 1 to 3, wherein m<sub>1</sub> + m<sub>2</sub> + m<sub>3</sub> is 5.
5. An ester F as per any of claims 1 to 4, wherein m<sub>1</sub> = m<sub>2</sub> = 2 and m<sub>3</sub> = 1.
6. An ester F as per any of claims 1 to 5, wherein R<sub>1</sub>, R<sub>2</sub> and R<sub>3</sub> are identical and preferably H.

7. A process for preparing an ester F as per any of claims 1 to 6 of alkoxyated trimethylolpropane of the formula II



where EO, PO, n1, n2, n3, m1, m2 and m3 are each as defined in any of claims 1 to 6,

with (meth)acrylic acid, comprising the steps of

- a) reacting alkoxyated trimethylolpropane with (meth)acrylic acid in the presence of at least one esterification catalyst C and of at least one polymerization inhibitor D and optionally also of a water-azeotroping solvent E to form an ester F,
- b) optionally removing from the reaction mixture some or all of the water formed in a), during and/or after a),
- f) optionally neutralizing the reaction mixture,
- h) when a solvent E was used, optionally removing this solvent by distillation, and/or
- i) stripping with a gas which is inert under the reaction conditions.

8. A process as claimed in claim 7, wherein

- the molar excess of (meth)acrylic acid to alkoxyated trimethylolpropane is at least 3.15:1 and
- the optionally neutralized (meth)acrylic acid present in the reaction mixture after the last step substantially remains in the reaction mixture.

9. A process as claimed in either of claims 7 and 8, wherein the (meth)acrylic acid is not more than 75% by weight removed from the reaction mixture obtained after the last step, which reaction mixture contains ester F.

10. A process as claimed in any of claims 7 to 9, wherein the reaction mixture obtained after the last step, which contains ester F, has a DIN EN 3682 acid number of at least 25 mg of KOH/g.

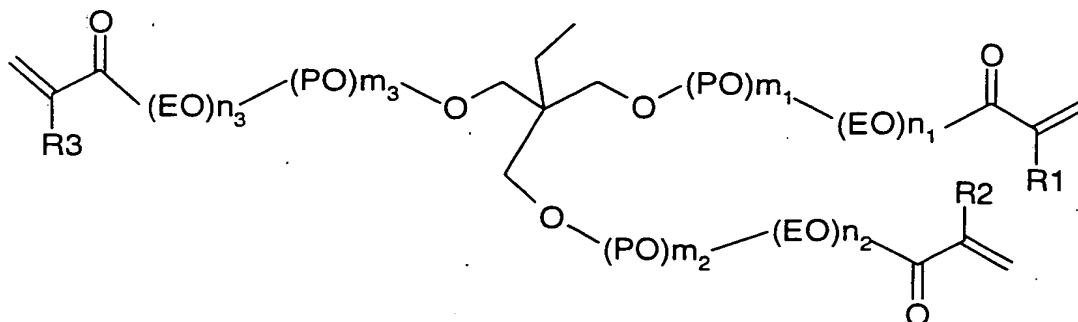
11. A process as claimed in any of claims 7 to 10, wherein the reaction mixture obtained after the last step, which contains ester F, has a (meth)acrylic acid content of at least 0.5% by weight.
- 5 12. A process as claimed in any of claims 7 to 11, wherein the molar ratio of (meth)acrylic acid to alkoxylated trimethylolpropane in reaction a) is at least 15:1.
13. A process for preparing a crosslinked hydrogel, comprising the steps of
- 10 k) polymerizing an ester F as per any of claims 1 to 6, with (meth)acrylic acid, with optionally additional monoethylenically unsaturated compounds N and optionally also at least one further copolymerizable hydrophilic monomer M in the presence of at least one free-radical initiator K and optionally of at least one grafting base L,
- 15 l) optionally postcrosslinking the reaction mixture obtained from k),  
m) drying the reaction mixture obtained from k) or l), and  
n) optionally grinding and/or sieving the reaction mixture obtained from k), l) or m).
- 20 14. A process for preparing a crosslinked hydrogel, comprising steps a) to i) as per any of claims 7 to 12 and additionally
- 25 k) polymerizing the reaction mixture from one of stages a) to i) if performed, with optionally additional monoethylenically unsaturated compounds N and optionally also at least one further copolymerizable hydrophilic monomer M in the presence of at least one free-radical initiator K and optionally of at least one grafting base L,
- l) optionally postcrosslinking the reaction mixture obtained from k),  
m) drying the reaction mixture obtained from k) or l), and  
30 n) optionally grinding and/or sieving the reaction mixture obtained from k), l) or m).
15. Polymer obtainable according to a process as per either of claims 13 and 14.
- 35 16. Crosslinked hydrogel containing at least one hydrophilic monomer M in copolymerized form crosslinked with an ester F as per any of claims 1 to 6.
17. Crosslinked hydrogel containing at least one hydrophilic monomer M in copolymerized form crosslinked with a reaction mixture which contains ester F and is obtainable according to a process of claims 7 to 11.
- 40

18. Use of a polymer as per any of claims 15 to 17 in hygiene articles, packaging materials and in nonwovens.
- 5 19. A composition of matter comprising
- from 0.1% to 40% by weight of at least one ester F as per any of claims 1 to 5 and (meth)acrylic acid,
  - 0.5 – 99.9% by weight of at least one hydrophilic monomer M,
  - 10 - 0 – 10% by weight of at least one esterification catalyst C,
  - 0 – 5% by weight of at least one polymerization inhibitor D, and
  - 0 – 10% by weight of a solvent E,
- with the proviso that the sum total is always 100% by weight.
- 15 20. A composition of matter as per claim 19, further comprising
- a diluent G ad 100% by weight.
- 20 21. Crosslinked hydrogel obtainable from a composition of matter as per claim 19 or 20 l) optionally postcrosslinking the reaction mixture obtained,
- m) drying the reaction mixture obtained directly or from l), and
  - n) optionally grinding and/or sieving the reaction mixture obtained directly or from l) or m).
- 25 22. Use of a reaction mixture obtainable according to any of claims 7 to 11 or of a composition of matter as claimed in claim 19 or 20
- as a free-radical crosslinker of water-absorbing hydrogels,
  - 30 - as a starting material for preparing polymer dispersions,
  - as a starting material for preparing polyacrylates,
  - as a paint raw material, or
  - as a cement additive.
- 35 23. Crosslinked hydrogel having a saponification index of less than 10, preferably less than 8.
24. Crosslinked hydrogel as per any of claims 15, 16, 17 or 21 having a saponification index of less than 10, preferably less than 9.

## (Meth)acrylic esters of polyalkoxylated trimethylolpropane

## Abstract

- 5 The present invention relates to novel (meth)acrylic esters of polyalkoxylated trimethylolpropane of the formula



where EO is O-CH<sub>2</sub>-CH<sub>2</sub>-

10

PO is independently at each instance O-CH<sub>2</sub>-CH(CH<sub>3</sub>)- or O-CH(CH<sub>3</sub>)-CH<sub>2</sub>-

n<sub>1</sub>, n<sub>2</sub> and n<sub>3</sub> are independently 4, 5 or 6,

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m<sub>1</sub> + m<sub>2</sub> + m<sub>3</sub> is 4, 5 or 6,

20

R<sub>1</sub>, R<sub>2</sub> and R<sub>3</sub> are independently H or CH<sub>3</sub>,

a simplified process for preparing these esters and the use of reaction mixtures thus obtainable.